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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/601,234	10/30/2000	Kenichi Morigaki	MAT-799US	8757

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EXAMINER
TSANG FOSTER, SUSY N

ART UNIT	PAPER NUMBER
1745	9

DATE MAILED: 01/16/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/601,234	MORIGAKI ET AL.	
	Examiner	Art Unit	
	Susy N Tsang-Foster	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 October 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4 and 8* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a) because they fail to show Figure 6 as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Paragraph 1 of page 26 of the specification mentions Figure 6.

3. The drawings are objected to because in Figure 2, the reference labels appear to be missing. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities:

On page 4 of the specification, it is unclear what the following phrases mean: "potentials more noble", "more noble potentials", and "potentials of the negative electrode using the foregoing inorganic compound material is noble".

Appropriate correction is required.

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

6. The use of the trademark KETCHEN BLACK has been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

7. The amendment filed 7/31/2000 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

The following changes constitute new matter:

On page 4 of the specification, line 8, changing the word "precious" to "noble".

On page 4 of the specification, line 19, changing the word "precious" to "noble".

On page 4 of the specification, line 26, changing the word "precious" to "noble".

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Objections

8. Claims 2 and 7 are objected to because of the following informalities:

In claim 2, the phrase "negative electrolyte" should be "negative electrode".

In claim 7, the Markush group should include the phrase "selected from the group consisting of..."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 3-5, 8, and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 3, the limitation "one of polyalkylene oxide and a derivative of the same" is indefinite because it is unclear what the derivatives of the polyalkylene oxide are meant to be claimed by applicants. There are innumerable polyalkylene oxide derivatives.

Claim 4 recites the limitation "said polymer" in line 2. There is insufficient antecedent basis for this limitation in the claim. In particular, claim 1 does not mention a polymer from which claim 4 alternatively depends.

Claim 5 recites the limitation "said polymer" in 2. There is insufficient antecedent basis for this limitation in the claim. In particular, claim 1 does not mention a polymer from which claim 5 alternatively depends.

In claim 5, the limitation "one of polyester and a derivative of the same" is indefinite because it is unclear what the derivatives of polyester are meant to be claimed by applicants. There are innumerable polyester derivatives.

In claims 8 and 9, the limitation "glass-type" is indefinite because it is unclear what type of glass is meant and to what extent is the solid electrolyte glass.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

12. Claims 1 and 3 are rejected under 35 U.S.C. 102(a) as being anticipated by JP 10-092424 A.

JP 10-092424 A discloses a non-aqueous electrolyte secondary battery comprising a positive electrode and a negative electrode capable of interacting and de-intercalating lithium (see paragraphs 5 and 11 of machine translation). In particular, lithium containing composite oxides for the positive electrode are disclosed in paragraph 11 of the reference. The negative electrode includes aluminum-M alloy powder where M can be Si, Zn, or Sn (see paragraph 7 of machine translation). The aluminum-M alloy powder can be coated with Sn, Zn, In, Pb, Mn, Mo,

Co, Cu, Fe, Ni, or two or more of these metals (see paragraphs 5 and 8 of machine translation) which meets the limitation that the aluminum-M alloy powder (which comprises particles) would be coated at least partially around the central portion of each alloy particle (composite particle) by a coating including at least one of a solid solution and an inter-metallic compound containing a) at least one of Sn, Si, or Zn, and b) at least one element selected from the group consisting of group 2 elements, transition metal elements, group 12 elements, group 13 elements, and group 14 elements exclusive of carbon.

A solid electrolyte serves as a separator between the positive and negative electrodes wherein the solid electrolyte can be made by mixing two or more lithium salts with polyethylene oxide which is a polyalkylene oxide to give a polymer gel electrolyte (see paragraph 12 of machine translation).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 10-092424 A in view of EP 730316 A1.

JP 10-092424 A discloses all the limitations of claims 2-4 (see paragraph 12 above) except that the positive electrode includes a polymer gel electrolyte and the negative electrode includes a polymer gel electrolyte.

EP 730316 A1 teaches polyvinylidene (PVDF) homopolymer or polyvinylidene fluoride (PVDF) copolymer as the solid electrolyte material for a separator and for the positive and negative electrodes of a lithium battery with electrolyte material being present in the separator and in the electrodes (see page 13, lines 35-50) because the PVDF provides for a porous structure in the separator and in the electrodes that would increase the utilization of the active material and electrolyte material (see page 5, lines 24-29) due to enhanced electrolyte mobility from the porous structure. The PVDF copolymer can be copolymers of vinylidene fluoride and hexafluoropropylene (see page 4, lines 30-35).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use PVDF homopolymer gel electrolyte or PVDF-HFP copolymer gel electrolyte as the polymer gel electrolyte in the battery of JP 10-092424 A because the PVDF homopolymer gel electrolyte or PVDF-HFP copolymer gel electrolyte are stable and compatible in a lithium battery environment and are conventionally used in the art. The use of these polymer gel electrolytes in the separator and in the electrodes also gives increased efficiency in the battery due to the porous structure of the polymer as taught by EP 730316 A1.

Furthermore, it would have also been obvious to one of ordinary skill in the art at the time the invention was made to use the polymer gel electrolyte in the electrodes of a lithium battery because the use of the same polymer matrix in the electrode and in the separator (solid electrolyte) ensures chemical compatibility of the polymer as a binder for the electrodes with the polymer electrolyte.

15. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 10-092424 A in view of Gies et al. (USP 5,665,265).

JP 10-092424 A discloses all the limitations of claim 7 except that the polymer gel electrolyte includes a non-woven fabric of a polyolefin polymers (see paragraph 12 above).

Gies et al. teaches a polymer gel electrolyte that includes a non-woven fabric of polyolefin polymers (col. 3, lines 18-60).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the polymer gel electrolyte of JP 10-092424 A include a non-woven fabric of polyolefin polymers for good mechanical integrity of the electrolyte as taught by Gies et al. (see col. 2, lines 15-20).

16. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 10-092424 A in view of EP 730316 A1 as applied to claim 2 above, and further in view of Gies et al. (USP 5,665,265).

JP 10-092424 A in combination with EP 730316 A1 (see paragraph 14 above) discloses all the limitations of claims 6 and 7 except that the polymer gel electrolyte includes a non-woven fabric of a polyolefin polymers, and that the polymer is a copolymer of methacrylate and an ethylene oxide.

Gies et al. teaches a polymer gel electrolyte that includes a non-woven fabric of polyolefin polymers (col. 3, lines 18-60) and that the polymer gel electrolyte can be polyethylene oxide, polymethylmethacrylate and copolymers thereof.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the polymer gel electrolyte of JP 10-092424 A include a non-woven fabric of polyolefin polymers for good mechanical integrity of the electrolyte as taught by Gies et al. (see col. 2, lines 15-20).

It would have also been obvious to one of ordinary skill in the art at the time the invention was made to use a copolymer of methacrylate and an ethylene oxide as the polymer gel electrolyte in the lithium battery of JP 10-092424 A because the copolymer is capable of absorbing electrolyte species to form a gel polymer electrolyte and it is functionally equivalent to the polyethylene oxide used in the solid electrolyte of the JP 10-092424 A as taught by Gies et al. (col. 3, lines 44-58).

17. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 10-092424 A in view of EP 730316 A1 as applied to claim 2 above, and further in view of St. Aubyn Hubbard et al. (USP 5,460,903).

JP 10-092424 A in combination with EP 730316 A1 (see paragraph 14 above) discloses all the limitations of claim 5 except that the polymer in the polymer gel electrolyte is a polyester polymer.

St. Aubyn Hubbard et al. teaches a polymer gel electrolyte comprising polyester polymer for a lithium battery (see abstract; col.2, lines 33-45; col. 3, lines 1-15, lines 35-41 and lines 65-67) because polymer gel electrolytes containing polyester as the polymer provides for mechanical rigidity.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use polyester as the polymer in the polymer gel electrolyte in the battery of JP 10-092424 A because polymer gel electrolyte comprising polyester has improved mechanical stability.

18. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 10-092424 A in view of Iwamoto et al. (USP 5,589,296).

JP 10-092424 A discloses a non-aqueous electrolyte secondary battery comprising a positive electrode and a negative electrode capable of interacting and de-intercalating lithium (see paragraphs 5 and 11 of machine translation). In particular, lithium containing composite oxides for the positive electrode are disclosed in paragraph 11 of the reference. The negative electrode includes aluminum-M alloy powder where M can be Si, Zn, or Sn (see paragraph 7 of machine translation). The aluminum-M alloy powder can be coated with Sn, Zn, In, Pb, Mn, Mo, Co, Cu, Fe, Ni, or two or more of these metals (see paragraphs 5 and 8 of machine translation) which meets the limitation that the aluminum-M alloy powder (which comprises particles) would be coated at least partially around the central portion of each alloy particle (composite particle) by a coating including at least one of a solid solution and an inter-metallic compound containing a) at least one of Sn, Si, or Zn, and b) at least one element selected from the group consisting of group 2 elements, transition metal elements, group 12 elements, group 13 elements, and group 14 elements exclusive of carbon.

A solid electrolyte serves as a separator between the positive and negative electrodes wherein the solid electrolyte can be made by mixing two or more lithium salts with polyethylene oxide which is a polyalkylene oxide to give a polymer gel electrolyte (see paragraph 12 of machine translation).

JP 10-092424 A does not disclose that the solid electrolyte is a lithium ion conductive glass solid electrolyte and that the glass solid electrolyte is synthesized with row materials including a first component including at least a lithium sulfide, a second component including at

least one of a silicon sulfide, a phosphor sulfide, and a boron sulfide, and a third component including at least one of lithium phosphate, lithium sulfate, lithium borate, and lithium silicate.

Iwamoto et al. teaches a solid electrolyte for a lithium battery (col. 1, lines 15-20; col. 2, lines 24-27; col. 13, lines 2-5) that is a lithium ion conductive glass solid electrolyte and that the glass solid electrolyte is synthesized with row materials including (see col. 2, lines 51-60) a first component including at least a lithium sulfide, a second component including at least one of a silicon disulfide (a silicon sulfide), diphosphorous pentasulfide (a phosphor sulfide), and a boron sulfide; and a third component including at least one of lithium phosphate, lithium sulfate, and lithium silicate (which is lithium orthosilicate) to give a solid electrolyte having a distinguished ion conductivity (col. 2, lines 5-11) and prevent leakage problems due to using liquid electrolytes (col. 1, lines 24-30).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the lithium ion conductive glass solid electrolyte of Iwamoto et al. that is synthesized with row materials including a first component including at least a lithium sulfide, a second component including at least one of a silicon disulfide (a silicon sulfide), diphosphorous pentasulfide (a phosphor sulfide), and a boron sulfide; and a third component including at least one of lithium phosphate, lithium sulfate, and lithium silicate (which is lithium orthosilicate) in the battery of JP 10-092424 A because the glass solid electrolyte has a distinguished ion conductivity and prevents leakage problems due to using liquid electrolytes as taught by Iwamoto et al. (col. 1, lines 24-30).

Double Patenting

19. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

20. Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3 of copending Application No. 09/601,421 in view of JP 10-092424 A.

Instant claim 1 of the present application recites a nonaqueous secondary battery comprising a positive electrode and a negative electrode capable of intercalating and de-intercalating lithium; a nonaqueous electrolyte solution and a solid electrolyte, wherein the negative electrode includes a plurality of composite particles, each composite particle includes a central portion containing at least one of tin, silicon, and zinc; and a coating at least partially around the central portion, the coating including at least one of a solid solution and an inter-metallic compound containing a) at least one of tin, silicon, and zinc, and b) at least one element selected from the group consisting of group 2 elements, transition elements, group 12 elements, group 13 elements, and group 14 elements exclusive of carbon, and wherein the solid electrolyte is a polymer gel electrolyte.

Instant claim 1of the present application differs from claims 1-3 of copending Application No. 09/601,421 in that it does not recite that the nonaqueous electrolyte includes an organic solvent in which anion lithium salt of an organic acid is dissolved and the nonaqueous electrolyte includes at least one compound selected from the group consisting of ethylene carbonate, dimethyl carbonate, diethyl carbonate, ethyl methyl carbonate, propylene carbonate, gamma-butyrolactone, and gamma-valerolactone, and that the anion of the lithium salt of the organic acid is either bis-trifluoromethane sulfonic acid imido lithium or bis-pentafluoroethane sulfonic acid imido lithium, or that a separator instead of a solid electrolyte is used.

JP 10-092424 A teaches that a solid electrolyte serves as a separator between the positive and negative electrodes wherein the solid electrolyte can be made by mixing two or more lithium salts with polyethylene oxide which is a polyalkylene oxide to give a polymer gel electrolyte (see paragraph 12 of machine translation). The polymer gel electrolyte also includes a nonaqueous electrolyte solution which includes ethylene carbonate, propylene carbonate, gamma-butyrolactore, and bis-trifluoromethane sulfonic acid imido lithium (see paragraph 12 of machine translation).

JP 10-092424 A teaches using a solid electrolyte or a separator in a lithium battery (see paragraphs 12 and 22 of machine translation)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have in the nonaqueous electrolyte of claim 1 of the present application to have the cited solvents and bis-trifluoromethane sulfonic acid imido lithium in claims 2 and 3 of copending Application No. 09/601,421 because these solvents and bis-trifluoromethane sulfonic

acid imido lithium are compatible in a lithium battery environment and are commonly used in the art.

It would have also been obvious to one of ordinary skill in the art to use a separator instead of a solid electrolyte in the lithium battery of instant claim 1 of the present application because the use of a separator is equivalent to the use of a solid electrolyte as taught by.JP 10-092424 A.

This is a provisional obviousness-type double patenting rejection.

Conclusion

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gozdz et al. (USP 5,296,318) discloses using the same polymer electrolyte composition in the electrolyte, and in the electrodes to ensure matrix compatibility between the battery components (col. 2, lines 55-65).

22. Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (703) 305-0588. The examiner can normally be reached on Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gabrielle Brouillette, Ph.D.can be reached at (703) 308-0756. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900.

The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9310 for regular communications and (703) 872-9311 for After-Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

st/13 January 2002

G. Brouillette

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